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Book Review

STACKS: Interoperability in Today's Computer Networks, by Carl Malamud, Prentice Hall, ISBN 0-13-484080-1.

[*STACKS* is also known as "The INTEROP Book"—a new source of information provided by the INTEROP Conference and Exhibition—and was produced as a professional reference book in cooperation with Prentice Hall. *ConneXions,* in which this review appears, is also a publication of Interop, Inc. —Ed.]

Organization

STACKS is an interesting meeting of the technology, politics, and usage of interoperable systems. In 285 pages, Malamud runs the gamut from new interpretations of the OSI model, LANs and WANs, protocol stacks, environments for distributed computing, network security and management, projects in high-speed networking, and how to find things in our current and future collection of interconnected networks.

As you might guess from the editor's note above, *STACKS* was conceived as a means for putting into perspective the entire INTEROP Conference and Exhibition. It succeeds marvelously at this. Malamud's style is seemingly both structured yet informal. For each area, he explains the origins and core aspects of the technology, and usually presents a case study describing its usage in the real world. His style is also disarmingly informal, as he easily glides from one topic to another in trying to make sense of the big picture of interoperability.

Reference Model

Initially *STACKS* begins with the OSI model and Malamud's revision, in which three new levels are layered on top: finance, politics, and religion. (The upper two layers are probably indistinguishable to the untrained eye, but this is a matter for future historians to decide.) Following this, we launch into a discussion as to why real-world solutions are largely multi-protocol. To present this, Malamud uses his previously published treatise on "Mangoes and Orangutans" in which he argues that of the three big-ticket network file methods, FTP, NFS, nor FTAM, none is ideal in all circumstances. In brief, each has evolved with a particular service model in mind, and, when used in combination, they can be complimentary in nature. [Ed.: See *ConneXions,* Volume 4, No. 11, November 1990 and *ConneXions,* Volume 5, No. 4, April 1991.]

New technologies

Following this, the concept of networks and internets in the real world is developed. Malamud makes the point, and rightly so, that its difficult to figure out the boundaries of our networks. The days of "our network is this yellow cable in this room" have disappeared. This leads to a discussion of the new technologies being developed for:

- Local area networks, i.e., FDDI, HIPPI—a High Performance Parallel Interface operating at 800 or 1600Mbps; and,
- Wide area networks, i.e., the ever-elusive ISDN, the amazingly popular Frame Relay, and some other technologies such as ATM, SONET, and my personal favorite, SMDS

Abstractions

STACKS then moves towards the edges of the network as it looks at how protocol suites are put together on host systems. The discussion focuses on two different abstractions used to hide the transport layer from the application: AT&T's *STREAMS* and DEC's *Towers.* In both cases, these are architectural mechanisms used to organize software—the absence or presence of such an abstraction shouldn't change the bits exchanged by the protocols.

The author is a bit light in this area as he doesn't really get into the weaknesses of these kind of schemes (in contrast, in earlier sections he is conversant where other technologies start to get into trouble). Once the discussion of *STREAMS* and *Towers* is out of the way, he looks at some interesting work being done in the end-to-end area:

- Speed (how fast can data be reliably moved between hosts); and,
- Size (how many hosts can be attached to an internet).

Glue

These scaling issues are then followed with a look at the "glue" which is used to bind networks together: routing protocols. Once the painful topic of so-called "extended Ethernets" (using bridges rather than routers to join remote LANs), STACKS looks at dynamic routing mechanisms. After a brief discussion on the theory of routing protocols, the current generation of protocols are briefly introduced: OSI's IS–IS, OSPF (the Internet's *Open Shortest Path First*), the old EGP (*Exterior Gateway Protocol*), and finally BGP (the *Border Gateway Protocol*).

Open Wars

STACKS then takes a look at the "Open Wars" as exemplified by the myriad of organizations competing to define open systems: OSF, ONC, OSI, etc. (Reviewer's comment: guess what word the first letter of each acronym stands for—now the fun part, observe that the word has entirely different meaning based on the acronym in which it appears). The power of *STACKS* in examining these efforts is showing how they contain many of the same components (e.g., ONC and OSF use MIT's *X Window System,* and OSI is considering it), and yet are miles apart on other issues such as naming. Finally, this section wraps up by looking at how some vendors are trying to reconcile these issues in their individual product lines.

The cost of standards

STACKS then wraps up with a discussion on network security (largely devoted to public key cryptosystems and the first large-scale use of such a technology in the Internet—*Privacy Enhanced Mail*), followed by a brief introduction to some efforts looking into gigabit networking and digital libraries. But, the best is saved for last as Malamud goes after the Public Standards Cartel with a vengeance. This closing chapter in *STACKS* is simply a classic: in 20 pages or so Malamud explains why organizations like the ISO and CCITT have failed to produce useful public standards—it is simply too difficult and expensive to get copies of the damnable things. There are too many good lines to repeat, but here is one of my favorites: Malamud orders up copies of some standards from a US supplier, the total cost is US$1350 and the cost per inch is—can you believe it—US$388! Malamud's point, made deftly at the end of the chapter is that the usefulness of a standard increases when anyone can get a copy, study it, and then implement it.

But, perhaps my favorite of Malamud's anecdotes is what happened when he sent copies of a draft of *STACKS* to several people, asking for a possible technical review (a commonly accepted practice for writers of professional texts). Speaking from experience, when you get back responses, the feedback is usually quite good. Well, one copy was sent to the OSF. This was completely reasonable as *STACKS* contains a fair bit of material on the OSF and technologies being developed by the OSF. Now, imagine Malamud's surprise when he gets back his manuscript from the OSF, along with a letter from their *General Counsel* indicating that they have returned the draft untouched because they don't review materials submitted by outside parties, in the interest of "vendor neutrality."

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Book Review *(continued)*

This legal type then warns Malamud not to represent that the OSF endorses his book in any way. Here Malamud is giving the OSF a chance to clear up any misunderstandings he might have about their work, and they drop a lawyer, a General Counsel no less, on him. I guess professional courtesy goes by the wayside when you're dealing with the big business of open systems. Of course, given the composition of the OSF, its membership and licensing arrangements, it can hardly claim to be "vendor neutral."

The Salman Rushdie Effect

Being good-natured, Malamud takes this in a humorous vein postulating it might have a Salman Rushdie effect: "Buy this book, OSF didn't endorse it." Well, I'd buy the book anyway—it's a great book (it's also got an excellent 40 page glossary that I forgot to mention earlier). But now, I'm going to buy two copies of *STACKS*. My second copy I'm going to send to the OSF, with a cover letter telling them what a great book it is! I suggest you do the same.

—Marshall T. Rose

Network Reading List available

by Charles Spurgeon, University of Texas at Austin

A new version of the document "Network Reading List: TCP/IP, UNIX, and Ethernet" is now available from the Network Information Center at the University of Texas at Austin. The list may be found on host `ftp.utexas.edu` (128.83.185.16). This is version 3.0 of the reading list, dated August, 1991.

What is it?

The network reading list is an annotated list of books and other resources focusing on three networking technologies that are in wide use: TCP/IP, UNIX, and Ethernet. A mix of resources is presented ranging from introductory information to in-depth technical details. Version 3.0 of the list has been completely rewritten and updated, and now includes nearly 70 items. The list is weighted towards resources that cover the territory well, and that deal with real-world problems found on growing networks. The table of contents is included below.

How do I get a copy?

You can retrieve a copy of the list in either *PostScript* format or as a plain ASCII text file. The *PostScript* format is recommended. The *PostScript* file is 34 pages long, and the ASCII text file contains 51 pages. Copies of the list may be retrieved using anonymous FTP or a mail-based archive server program.

The hostname for anonymous FTP is `ftp.utexas.edu`, and the files are in the `pub/netinfo/docs` and `pub/netinfo/ps` directories as `net-read.txt` and `net-read.ps` respectively.

The e-mail address of the archive server program is `archive-server@ftp.utexas.edu`. You can retrieve copies of the list by sending the archive server program a command line in the body of an electronic mail message. The command line:

```
send ps net-read.ps
```

will cause the archive server program to send you a copy of the *PostScript* file, while the command line:

```
send docs net-read.txt
```

will retrieve the ASCII text file.